Original article

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Evaluation of the end colostomy complications and the risk factors influencing them in Iranian patients

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Abstract

Introduction The aim of this study was to assess the prevalence of end colostomy complications and the evaluation of factors influencing outcome.

Patients and methods. Three hundred and thirty patients with end colostomy were studied. All patient were recalled for examination for recent complications. Early complications included stoma site pain, early dermal irritation (during the first month after surgery), mucosal bleeding, stomal prolapse and psychosocial complications. Late complications included peristomal hernia, stomal stenosis, late dermal irritation (after the first month), stomal retraction, stomal necrosis and other stoma complications (perforation, fistula etc.). Probable underlying factors were studied. To evaluate risk factors affecting complications, univariable analysis and then multivariable analysis by binary logistic regression was performed.

Results One hundred and one (30.6%) patients had no complications and the remainder had at least one of early or late complications. Overall, psychosocial complications, 56.4%; mucosal bleeding, 34.5%; early dermal irritation, 23.5% were the most frequent complications. Peristomal hernia (11.2%) was the most common late complication. Those aged >40 years had significant associations with psychosocial problem (OR = 2.77), mucosal haemorrhage (OR = 2.19), and early dermal irritation (OR = 3.14). The risks of peristomal hernia and early dermal irritation are greater in the patients with BMI >25 kg/m^2 (OR = 2.08 and 2.55, respectively).

Conclusion The risk of most prevalent complications of colostomy construction increases in elder patients. The high prevalence of psychosocial and skin problems in patients with a colostomy, needs special attention especially from the viewpoint of education by trained stoma nurses and preparation of standard equipment.

Keywords End colostomy, early complication, late complication, risk factor, underlying diseases

Introduction

Advances in sphincter-saving surgery have not eliminated the need for a permanent colostomy. Abdominoperineal resection with permanent colostomy is still necessary in at least 11% of patients suffering from rectal carcinoma [1,2]. Approximately 40% of Hartmann's colostomies remain permanent [3–5]. The majority of patients with colostomy seem well adapted after a period of time, but early and late complications remain a problem. Generally, complications of stoma creation can be divided up into two categories, early complications and late complications with different incidence rates and risk factors [6].

It is believed that colostomy construction under the care of a colorectal surgeon and stoma nurse would reduce the risk of postoperative complications [7]. In countries like Iran where shortage of resources limits the accessibility to the suitable colostomy instruments and trained, experienced staff in the field of stoma care are scarce, there might be different patterns of postoperative complications in patients with stomas.

The aim of this study was to assess the prevalence of complications and evaluate factors having association with them among a large number of Iranian patients with permanent end colostomies.

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Patients and methods

Study design and samples

This retrospective cross-sectional study was conducted from January 2004 to March 2004 for the evaluation of the early and late complications of 330 patients with end colostomy. The clinical notes of patients with an end colostomy, who had routine visits in the colorectal clinic of Hazrate Rasoule Akram Hospital in Tehran and members of Iranian Colostomy Society, were, respectively, reviewed randomly. The sample size calculated for the estimation of a proportion with the assumption of type I error (α) 5%, predicted the probability of the most prevalent complication at 50%, and a clinical difference of 8% equal to 330 patients.

Procedures and variables

Researchers recalled all patients whose clinical notes were selected randomly and reviewed retrospectively, to examine them for the evaluation of recent complications. The time of constructing colostomies was from January 1996 to December 2003. All patients, had pre-operative marking of stomas and in total 14 different surgical teams were involved. Information about early and late complications, also the underlying factors including indications for colostomy, age, BMI (body mass index) at the time of surgery, gender, underlying disease, history of previous abdominal surgeries, positive history of immunodeficiency, i.e. lymphoproliferative malignancies, immunosuppressive or corticosteroid drugs consumption; specialty of surgical group, i.e. general surgeons *vs* colorectal surgeons; emergency surgery *vs* elective surgery, and finally the site of colostomy, i.e. end sigmoid, end descending colon or end transverse colon, were collected. For the purpose of evaluating the factors influencing outcome, cut-off points for BMI and age were defined. The cut-off point for obesity was stated as the BMI ≥ 25 kg/m^2. Age was classified into two groups, < 40 years and ≥ 40 years.

All complications were classified into two groups; i.e. early and late. Complications occurring whilst a postoperative inpatient were considered as early ones, except for early dermal and psychiatric complications, which were evaluated one month postsurgery. The remaining were considered as late complications. The early complications applied to stoma site pain, early dermal irritation (in the first month postoperatively), any change in the bowel habit, stoma mucosal haemorrhage, stoma necrosis, stoma prolapse and psychosocial complications. On the other hand, complications such as peristomal hernia, stoma stenosis, late dermal irritation (remaining after the first month post operation), and stoma retraction were considered as late ones.

Dermal irritation depended on the presence of any skin irritation around the stoma regardless of its severity and surface. Mucosal haemorrhage was defined as the presence of persistent bleeding from the stoma that could not be easily stopped with short pressure on the site of bleeding which did not stop spontaneously. All patients were asked whether their social, sexual and personal activities had been disturbed significantly by the colostomy or not, in the visits one month after surgery. No standardized questionnaire was applied for the evaluation of psychosocial problem and its severity.

Statistical analysis

Quantitative variables described as mean (SD) and qualitative ones as frequency (relative frequency). The Mid–*P* 95% confidence intervals were calculated in the description of complications' relative frequencies. To evaluate factors associated with each complication, underlying variables were assessed. A significant relationship with each complication was determined by using two-tailed Fisher's exact and χ^2 tests and also two-tailed independent samples *t*-test. The factors which were significant were entered into a multivariate analysis performed by using binary logistic regression method. The presence of each complication considered as a dependent variable. The risk of hazard was demonstrated by the OR (odds ratio) and its 95% confidence interval. Probability (*P*) values < 0.05 were considered as significant. SPSS® for Windows version 10.0.1 was used to perform the analysis.

Results

Three hundred and thirty patients with an end colostomy were studied, among which 172 (52.1%) patients were male and 158 (47.9%) were female, with a mean age of 57.49 ($\pm$ 12.28) years. In total, 101 (30.6%) patients had no complications. Table 1 shows the distribution and comparison of demographic and clinical characteristics by the presence or absence of problems. Generally, complications tend to occur more in elderly patients ($P = 0.000$). The distribution of other characteristics did not differ significantly among the complication and noncomplication groups.

Psychosocial disturbance (67.5%) and mucosal haemorrhage (56.4%) were the most frequent problems, and the most common late complication was peristomal herniation 11.2% (Table 2).

As shown in Table 3 malignancy, diverticulitis and trauma were the most prevalent indications for constructing a colostomy. There was no significant difference in

Table 1 Comparison of demographic and clinical characteristics in complication and noncomplication group.

Characteristics	Total patients ($n = 330$)	No- complication group ($n = 101$)	Complication group ($n = 229$)	*P*-value*
Sex				
Male	172	53	119	0.07
Female	158	48	110	
Anatomic site				
End sigmoid	287	88	199	0.597
End descending colon	13	5	8	
End transverse colon	30	8	22	
History of previous operation				
No	297	94	203	0.217
Yes	33	7	26	
History of immune deficiency				
No	328	101	227	1.000
Yes	2	0	2	
Surgery service				
General	281	83	198	0.318
Colorectal	49	18	3	
Emergency surgery				
No	278	83	195	0.494
Yes	52	18	34	
Age (years)				
Mean	57.49	51.2277	60.2576	0.000
SD	12.28	12.40	11.18	
BMI (kg/m^2)				
Mean	23.66	23.5446	23.7205	0.591
SD	3	2.50	3.20	

**P*-values are based on two-tailed Fisher's exact, Yates' corrected χ^2 test or independent samples *t*-test, whichever is appropriate, between noncomplication and complication group.

Table 2 Frequency of early and late complications.

Complication	Number of complications (relative frequency, 95% CI)
Early Complications	223 (67.57%, 62.19% – 72.5%)
Psychosocial	186 (50.9%, 45.5% – 56.2%)
Mucosal haemorrhage	114 (34.54%, 29.5% – 39.8%)
Early dermal irritation	77 (23.33%, 19% – 28.1%)
Change in bowel habit	49 (14.84%, 11.3% – 18.9%)
Stoma pain	21 (6.36%, 4% – 9.4%)
Stomal prolapse	3 (0.9%, 0.2% – 2.4%)
Stomal necrosis	3 (0.9%, 0.2% – 2.4%)
Late Complications	77 (23.3%, 19% – 28.1%)
Parastomal hernia	37 (11.21%, 8.1% – 14.9%)
Stomal stenosis	32 (9.69%, 6.8% – 13.2%)
Late dermal irritation	19 (5.75%, 3.6% – 8.68%)
Stomal retraction	3 (0.9%, 0.2% – 2.4%)

the distribution of indications for surgery between groups with and without complication, except trauma, which had higher frequency in the noncomplication group.

The underlying factors including gender, specialty of surgeon, anatomic site, emergency surgery, diverticulitis, trauma and positive history of immunodeficiency did not significantly associate with outcome.

Age >40 years was associated with the psychosocial complications (OR = 2.77 (95% CI 1.7–4.49)), early dermal irritation (OR = 3.14 (95% CI 1.56–6.32)) and mucosal bleeding (OR = 2.19 (95% CI 1.28–3.74)). A history of previous surgery (OR = 6.18 (95% CI 2.68–14.24)) was strongly related to peristomal hernia. An increase in BMI (> 25 kg/m^2) was also associated with the presence of peristomal hernia and early dermal irritation (Table 4).

Discussion

Despite the advances of modern surgery, complication rates for stoma formation remain high. The greatest risk of developing complications is within the first five years, but there is a small but continuing risk thereafter [8,9]. The most important surgical complications of stoma

Table 3 Comparison of surgery indications in complication and noncomplication group.

Indication	Total patients ($n = 330$)	Non complication group ($n = 101$)	Complication group ($n = 229$)	*P*-value*
Malignancy	224 (67%)	72 (71%)	152 (66.3%)	0.3
Diverticulitis	58 (17%)	16 (15.8%)	42 (18.3%)	0.5
Trauma	25 (7.5%)	12 (11.8%)	13 (5.6%)	0.04
Ischaemia	14 (4.2%)	1 (0.9%)	13 (5.6%)	0.09
Ulcerative colitis	2 (0.6%)		2 (0.8%)	1
Crohns disease	1 (0.3%)		1 (0.4%)	1
Others	6 (1.8%)		6 (2.6%)	0.23

**P*-values are based on two-tailed Fisher's exact or Yates' corrected chi-squared test, whichever is appropriate, between non complication and complication groups.

Table 4 Evaluation of factors influencing complications.

	Risk factors*			
Complications	Positive history of previous abdominal operation	Age > 40 years	BMI > 25 kg/m^2	Malignancy as the cause of operation
Psychosocial complications		2.77 (1.7–4.49)		
Mucosal bleeding		2.19 (1.28–3.74)		
Early dermal irritation		3.14 (1.56–6.32)	2.08 (1.12–3.84)	
Peristomal hernia	6.18 (2.68–14.24)		2.55 (1.17–5.53)	
Stomal stenosis				3.34 (1.67–7.48)

*The risks are expressed by Odd's Ratio (95% confidence interval).

creation include ischaemic necrosis (1–10%), retraction (1–6%), stenosis (2–10%), prolapse (2–12%), peristomal fistula (7–10%), cancer at the stoma site (2–10%), peristomal hernia (2–37%), and peristomal abscess (1–12%). Ileostomies may also be complicated by peristomal dermatitis, dehydration and bleeding from peristomal varices [6].

In the current study there is a high total complication rate, most of which related to psychosocial and skin problems. The range of early and late complication varies in different studies because of various technical procedures and methodological considerations. The prevalence of complications in the report of Park *et al.* [10] was 34%, more than half of which occurred early in the first month after operation, with the remainder occurring after the first month. Londono-Schimmer *et al.* [9] reported a complication rate of 51.2%, among which paracolostomy hernia was the most common complication. In the study by Saghir *et al.* [11] of 121 patients with colostomies, 68% had stoma-related morbidity.

In comparison with similar studies, however, our findings of early and late dermal irritation, mucosal haemorrhage and also psychosocial complication are more prevalent, but the frequency of stoma prolaps, pain, necrosis, stenosis, retraction and peristomal hernia are in the expected ranges [10,12]. Also, in previous studies such a high rate of mucosal bleeding has not been reported. It seems that the high frequency of dermal irritation and mucosal bleeding in the current study relate to technical problems in stoma care. The majority of these cases did not have accessibility to optimal and standard colostomy bags because of high costs and shortage of available standard colostomy equipment in Iran. By using inappropriate irrigation instruments and colostomy bags, the development of mucosal bleeding and dermal irritation is inevitable because of mucosal dryness and leakage of faeces. On the other hand, the absence of a stoma nurse complicates the process of stoma care, especially in elderly patients. Patients whom have not been taught the essential principles of stoma care usually have more problems in dealing and coping with their new situation. For instance, dermal irritation would be anticipated, if a patient were not able to clean the stoma correctly. The presence of such preliminary technical support with trained staff in the field of stoma care might improve the outcome.

Approximately 25% stoma patients experience clinically significant psychological symptoms postoperatively.

Psychological disorders are often not detected by those involved in the care of stoma patients. Past psychiatric history, dissatisfaction of pre-operative preparation, post-operative physical symptomatology, and the presence of negative stoma related thoughts or beliefs have all been shown to be significantly associated with psychological morbidity after surgery [13–15]. Psychosocial disorder represented the major part of postoperative problems in our patients and has a rather high frequency compared to other reports. As has already been mentioned, we did not use any standard questionnaire to evaluate the exact mental status of patients, so the type and the degree of psychiatric disorders were not determined. Asking an open question about the social, personal and sexual disturbances postoperatively could not reveal all aspects of mental status and many patients with brief psychogenic disorders might be ignored. The likelihood of mental illnesses in our patients would be higher than 56.4%, if we used more precise tools. From the other point of view it is critical to assess pre-operative psychiatric history to discriminate postoperative problems from those that have started before the operation. Wade [7] demonstrated that patients who employed stoma care nurses had better psychological adjustment in comparison with those who did not. As has been mentioned earlier the presence of nursing intervention may improve the outcome of psychosocial problems. This subject needs more study. Our findings also showed that the likelihood of psychosocial problems increases in elderly patients. This finding suggests that colostomy patients, especially the elderly ones, need psychological support, i.e. pre and postoperative consultations and regular visits with stoma nurses.

All previous studies have claimed that gender, immunodeficiency and the anatomical site of colostomy could not predict stoma complications, and also that stoma outcome is similar in different diagnostic groups [16–18]. According to our findings, malignancy as an underlying disease was the only diagnosis affecting the outcome of stoma formation having an association with the stoma stenosis. This relationship has not been previously shown. Leenen *et al.* [19], Porter *et al.* [18], and Duchesne *et al.* [17] also have concluded that emergency surgery was not associated with stoma complications, a finding that has been confirmed in our study. Other reports also revealed that the post surgical stoma complications are the same regardless of whether the surgery has been an emergency or not [8,19,20].

As with the previous studies, age increase in our cases was associated with a rise in the risk of mucosal bleeding, and early dermal irritation. Hellman & Lago [21] concluded that there might be a direct relationship between age and peristomal skin problems. Saghir *et al.* [11] and Park *et al.* [10] showed that the age of the patient was the only factor that independently influenced the outcome of stoma surgery and they identified age as predictor of stoma complications. Moreover, all studies concluded that obesity predisposes patients to complications. It has been demonstrated that moderate obesity had no significant influence on the outcome of the procedure, but obese patients had a statistically higher incidence of necrosis, peristomal herniae and stoma retraction [17,19]. Our results indicated that increase in BMI, > 25 kg/m^2 is a risk factor for development of early dermal irritation and peristomal hernia.

In conclusion, our findings indicate that, to some extent, the outcome of end colostomies in Iranian patients differ from the reports of the other countries and the differences become more prominent especially in the case short-term problems. Elderly patients were shown to be at the higher risk of developing complications, a point that must be considered in the stoma care programs. The stoma outcome seems to be related to the shortage of stoma nurses and also lack of standard equipment. These findings emphasize again the important role of stoma care education and of stoma related organizations in the prevention of stoma complications. Further studies are necessary for the evaluation of psychiatric illnesses among stoma patients and their probable contributing factors.

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